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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/807,944	03/24/2004	Francesco de Rege Thesauro	100209	5134
29050	7590	06/14/2007		
STEVEN WESEMAN ASSOCIATE GENERAL COUNSEL, I.P. CABOT MICROELECTRONICS CORPORATION 870 NORTH COMMONS DRIVE AURORA, IL 60504			EXAMINER GEORGE, PATRICIA ANN	
			ART UNIT 1765	PAPER NUMBER
			MAIL DATE 06/14/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/807,944	Applicant(s) DE REGE THESAURO ET AL.	
	Examiner Patricia A. George	Art Unit 1765	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 February 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Continued Examination*

A request for continued examination, was filed in this application after final rejection. Applicants' petition to revive was granted 5/25/2007. Please see new grounds for rejection below.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Small et al. (2003/0162398) in view of Bringham et al. (6,812,193) and Sethuraman et al. (5,972,124).

Small teaches an aqueous composition for chemical-mechanical polish (ab.) of metals, such as tantalum. As for applicants' limitation abrasives types, Small teaches a broad selection of types, such as alumina, fumed alumina, and titania [para.24], as in claims 4, 10, and 11, and also use of any typical abrasive [para.11], which includes

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every types of abrasive cited in applicants' claims 1, 4, 10, and 11. (Evidenced of typical types of particles used for grinding and polishing is provided: Table 1.3 Mechanical Properties of Ceramics, Handbook of Ceramic Grinding and Polishing Edited by: Marinescu, Loan D.; Tonshoff, Hans K.; Inasaki, Ichiro © 2000 William Andrew Publishing/Noyes). As for applicants' limitation of ion of metal, Small teaches the use of metal ions [para. 31] as a catalyst, but that these catalysts may be in a variety of forms such as nitrides and chlorides which are soluble (i.e. provide ions) (see Small's reference at para 0031, then evidenced by <http://chemistry.about.com/library/weekly/blsolubility.htm>; Solubility Rules); abrasive particles [para.10]; and that they may be used in quantities up to 50 wt% of the composition [para. 27], which encompasses the quantities limitations of claims 1, 5, 6, 7, 10, 12, 13, and 14. Small teaches the metal abrasive particles are catalysts which favorably interact to generate free radicals effective in targeting the material on the substrate surface, facilitating or accelerating the removal at the site of the targeted material [para.12]. Small teaches the abrasive particles are of any metal group other than those from groups 4(b), 5(b), and 6(b) of the periodic table of elements [para.10], which encompasses the claimed types listed in claim 1 and 10. Small teaches the slurry comprises water [para.41], as in claims 1 and 10, and that it has a pH of about 2 to 11, which overlaps and encompasses the pH limitations of claims 8, 9, 15 and 16.

It is noted that Small is silent as to a specific quantity of metal ions as defined in applicants' claims 1, 2, 3, and 10.

Bringham et al. (6,812,193) teaches a slurry used for polishing metals, such as tantalum (see Summary...), includes about 0.001 to 5 grams/liter of metal ions such as those presented as salts of calcium, chloride ion, which appears to encompass applicants' claimed ranges of about 0.05 to about 5 mmol/kg and about 0.05 to about 10 mmol/kg (see Best and Various Modes...). Bringham et al. teaches the role of the abrasive is to facilitate material removal by mechanical action and the oxidizing agent, typically inorganic metal salts (i.e. chloride ions), works to enhance mechanical removal via a dissolution process.

Absent of unexpected results, it would have been obvious to one of ordinary skill in the art at the time of invention was made, to include any amount of metal ions, such as applicants' specifically claimed quantity, when teaching the slurry for metal polishing, as Small, because Bringham teaches use of such quantities of metal ions will enhance mechanical removal.

It is noted, that Bringham fails to use the units of mmol/kg of ions as defined in applicants' claims 1, 2, 3, and 10, however, it appears as if the disclosed amounts of metal ions would overlap applicants' claimed mmol/kg upon unit conversion.

It would have been obvious to one of ordinary skill in the art at the time of invention was made, to convert the grams/liter, as taught by Bringham, into molarity, as applicants' claimed unit, if the density of the composition is known. Further, the density of the composition can be easily measured.

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Small is silent as to the type of alpha particles being alpha alumina, as in claim 1 and 10. Sethuraman et al. teaches it is conventional to use alpha alumina particles as claimed (see abstract), when forming a CMP polishing compositions.

It would have been obvious to one of ordinary skill in the art at the time of invention was made, to select alpha alumina particles as the type of alumina in Small's slurry, because Sethuraman illustrates alpha alumina is effective for CMP polishing compositions.

### ***Response to Arguments***

Applicant's arguments filed 2/01/07, on page 2, has been fully considered and is persuasive. Examiner agrees that the reference of Small et al. fails to explicitly teach a quantity of metal ions.

### ***Conclusion***

Prior art is heavily populated with teachings about use of metal ions (nitride or chloride or sulfate or calcium or strontium or barium) in a CMP slurry used to polish metals (including noble metals: gold or silver or tantalum or platinum or palladium or rhodium). The unit of mmol/kg is not the standard unit used in the art for quantifying metal ions in slurry.

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patricia A. George whose telephone number is (571)272-5955. The examiner can normally be reached on weekdays between 7:00am and 4:30pm.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571)272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
PAG  
06/07

Patricia A George  
Examiner  
Art Unit 1765

DUY-VU N. DEO  
PRIMARY EXAMINER

  
6/11/07